

## CLAIMS

The invention claimed is:

1. An amusement ride having a rapid-winding winch and a cable, the rapid-winding winch comprising:
  - a) an energy storage mechanism;
  - b) one or more tethers coupled directly or indirectly to the elastic devices;
  - c) an axle having a winding surface with a diameter, wherein the tethers are windable and unwindable about the winding surface of the axle; and
  - d) at least one drum coupled directly or indirectly to the axle and having a winding surface with a diameter, wherein the cable is windable and unwindable about the winding surface of the drum, the drum winding surface diameter being greater than the axle winding surface diameter to provide a mechanical advantage when winding and unwinding the cable.
2. The amusement ride of Claim 1, wherein the energy storage mechanism comprises at least one telescopic spring device having a series-coupled sleeve and spring configuration of two or more concentric sleeves, two or more coil springs concentrically arranged within the sleeves, and a plunger extending through the springs, wherein the springs are compressed by the sleeves and the plunger when the sleeves are extended telescopically.
3. The amusement ride of Claim 2, wherein the telescopic spring device has at least one launch spring and one or more catch springs, wherein the launch spring has a spring factor selected to launch the carriage at a high velocity and the catch springs have a spring factor selected to be less than the launch spring launch to dampen the carriage motion.
4. The amusement ride of Claim 2, wherein the sleeves have flanges and the plunger has a flange, wherein the springs are compressed upon engagement by the sleeve flanges and the plunger flange.

5. The amusement ride of Claim 2, wherein at least one of the springs has a different spring factor than another one of the springs.

6. The amusement ride of Claim 2, wherein each telescopic spring device includes at least one set of two or more coil springs stacked end-to-end.

7. The amusement ride of Claim 6, wherein in each set of springs, at least one of the springs has a different spring factor than another one of the springs.

8. The amusement ride of Claim 1, wherein the energy storage mechanism comprises at least one spring device having a coil spring and a plunger extending through the spring, wherein the spring is compressed by the plunger when the plunger is moved.

9. The amusement ride of Claim 1, wherein the energy storage mechanism comprises at least one extension spring, compression spring, torsion spring, flat spiral spring, power spring, clock spring, main spring, or bungee cord.

10. The amusement ride of Claim 1, further comprising one or more actuators coupled to the energy storage mechanism and operable to charge the energy storage mechanism.

11. The amusement ride of Claim 9, wherein the energy storage mechanism includes two or more of elastic devices, with at least one of the elastic devices coupled directly or indirectly to at least one of the actuators and with at least one other of the elastic devices not coupled to any of the actuators.

12. The amusement ride of Claim 1, further comprising one or more brake or lock mechanisms operably coupled to the winding mechanism, the energy storage mechanism, the carriage, or the cable for releasably securing the carriage in place.

13. The amusement ride of Claim 1, further comprising an attachment member coupled between the energy storage mechanism and the tethers, and a safety member extending through an opening defined in the attachment member.

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14. The amusement ride of Claim 1, further comprising at least one passenger carriage operably engaged by the cable wherein the winding mechanism winds and unwinds the cable to move the carriage.

10 15. The amusement ride of Claim 14, wherein the cable is coupled to the carriage or the cable is coupled to a guide assembly that releasably engages the carriage.

15 16. The amusement ride of Claim 14, further comprising a track that guides the carriage.

17. The amusement ride of Claim 16, further comprising at least one roller assembly coupled to the carriage and supported by the track.

20 18. The amusement ride of Claim 16, wherein the track is configured in an open or closed loop.

25 19. The amusement ride of Claim 16, wherein the track has at least one section that is linear, curved, looped, sinusoidal, corkscrewed, elevated and intermediate, elevated and distal, or suspended above ground.

20. The amusement ride of Claim 16, wherein the track comprises a looped segment and two deceleration ramps extending from the looped segment.

30 21. The amusement ride of Claim 16, wherein the track is configured so that the carriage travels back-and-forth along the same section of the track.

22. The amusement ride of Claim 16, further comprising a support structure having one or more towers with the track mounted thereto.

23. The amusement ride of Claim 16, further comprising a launch frame having a launch platform where a person may stand or sit, wherein the energy storage mechanism and the winding mechanism are coupled to the launch frame, and the launch frame is coupled to the tower so that the launch frame can be hoisted to an elevated position.

24. The amusement ride of Claim 16, further comprising one or more towers, wherein the carriage includes a frame with rollers that ride on the towers as the frame travels vertically up and down the towers.

25. The amusement ride of Claim 16, further comprising one or more pulleys with the cable routed around the pulleys.

26. The amusement ride of Claim 25, wherein the cable is routed between the pulleys and the energy storage mechanism in a closed loop.

27. The amusement ride of Claim 16, wherein the track includes an acceleration section, a deceleration section, and a coasting section disposed therebetween, and the amusement ride includes a first rapid-winding winch disposed adjacent the acceleration section and a second rapid-winding winch disposed adjacent the deceleration section of the track.

28. The amusement ride of Claim 16, further comprising an energy absorbing mechanism disposed adjacent the track for engaging and dampening the motion of the cable.

29. The amusement ride of Claim 16, further comprising a retracting assembly for moving the carriage charge the energy storage mechanism.

30. A rapid-winding winch for winding and unwinding a cable, the winch comprising:

a) at least one telescopic spring device with a series-coupled sleeve and spring configuration;

b) at least one winding mechanism coupled directly or indirectly to the telescopic spring device, the winding mechanism including a winding surface for winding and unwinding the cable.

31. The winch of Claim 30, wherein the telescopic spring device has two or more concentric sleeves, two or more coil springs concentrically arranged within the sleeves, and a plunger extending through the springs, wherein the springs are compressed by the sleeves and the plunger when the sleeves are extended telescopically.

32. The winch of Claim 30, wherein the winding mechanism comprises:

a) one or more tethers;

b) an axle having a winding surface with a diameter, wherein the tethers are windable and unwindable about the winding surface of the axle; and

c) one or more drums coupled directly or indirectly to the axle and having a winding surface with a diameter, wherein the cables are windable and unwindable about the winding surface of the drums, the drum surfaces diameter being greater than the axle winding surface diameter to provide a mechanical advantage when winding and unwinding the cables.

33. The winch of Claim 30, wherein the winding mechanism comprises a plurality of pulley wheels arranged as a first bank of pulley wheels and a second bank of pulley wheels with the cable routed around the pulleys.